

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**In re Application of:**

Naik et al.

**Serial No.:** Not Yet Assigned

**Filed:** March 18, 2004

**For:** ENTRAPMENT OF  
BIOMOLECULES AND INORGANIC  
NANOPARTICLES BY  
BIOSILICIFICATION

**Confirmation No.:** Unknown

**Examiner:** Unknown

**Group Art Unit:** Unknown

**Attorney Docket No.:** 3148-6231.1US

**NOTICE OF EXPRESS MAILING**

Express Mail Mailing Label Number: EV348040832

Date of Deposit with USPS: March 18, 2004

Person making Deposit: Christopher Haughton

**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In compliance with the duty to disclose information material to patentability pursuant to 37 C.F.R. § 1.56, it is respectfully requested that this Information Disclosure Statement be entered and the documents listed on attached Form PTO-1449 be considered by the Examiner and made of record. Copies of the listed documents are enclosed pursuant to 37 C.F.R. § 1.98(a).

In accordance with 37 C.F.R. § 1.97(g) and (h), filing of this Information Disclosure Statement is not to be construed as a representation that a search has been made or an admission that the information cited herein is, or is considered to be, material to patentability as defined in

37 C.F.R. § 1.56(b). Further, no representation is made by Applicants herein that no other possible material information as defined in 37 C.F.R. § 1.56(b) exists.

U.S. Patent Documents

<u>U.S. Patent No.</u>	<u>Publication Date</u>	<u>Patentee</u>
3,821,083	06/28/1974	Van Leemputten et al.
5,874,109	02/23/1999	Ducheyne et al.
5,951,962	09/14/1999	Müller et al.
6,395,299 B1	05/28/2002	Babich et al.
6,495,352 B1	12/17/2002	Brinker et al.
US 2002/0015985 A1	02/07/2002	Takahashi et al.

Foreign Patent Documents

<u>Document No.</u>	<u>Publication Date</u>	<u>Patentee</u>
WO 00/35993 A1	06/22/2000	Morse et al.
WO 01/62906 A2	08/30/2001	Basheer
WO 02/068454 A2	09/06/2002	Ackerman et al.
EP 1 252 184 A1	10/23/2002	Kajino et al.
WO 03/066209 A1	08/14/2003	Marteaux et al.

Other Documents

Akbarian, F., et al., "Spectroscopic Determination of Cholinesterase Activity and Inhibition in Sol-Gel Media," Journal of Sol-Gel Science and Technology 8, pp. 1067-1070 (1997).  
Alsen, C., et al., "Studies on Acetylcholinesterase and Cholinesterase Covalently Bound to Polymaleinic Anhydride," Biochimica et Biophysica Acta 377, pp. 297-302 (1975).  
Altstein, M., et al., "Sol-Gel-Entrapped Cholinesterases: A Microtiter Plate Method for Monitoring Anti-cholinesterase Compounds," J. Agric. Food Chem. 46, pp. 3318-3324 (1998).  
Avnir, D., et al., "Enzymes and Other Proteins Entrapped in Sol-Gel Materials," Chem. Mater. 6, pp. 1605-1614 (1994).  
Bruins, M. E., et al., "Thermozymes and Their Applications," Applied Biochemistry and Biotechnology 90, pp. 155-186 (2001).

Drott, J., et al., "Porous Silicon as the Carrier Matrix in Microstructured Enzyme Reactors Yielding High Enzyme Activities," J. Micromech. Microeng. 7, pp. 14-23 (1997).

Gill, I., et al., "Bioencapsulation Within Synthetic Polymers (Part 1): Sol-Gel Encapsulated Biologicals," TIBTECH 18, pp. 282-296 (July 2000).

Gill, I., et al., "Bioencapsulation Within Synthetic Polymers (Part 2): Non-Sol-Gel Protein-Polymer Biocomposites," TIBTECH 18, pp. 469-479 (Nov. 2000).

Gill, I., et al., "Encapsulation of Biologicals within Silicate, Siloxane, and Hybrid Sol-Gel Polymers: An Efficient and Generic Approach," J. Am. Chem. Soc. 120, pp. 8587-8598 (1998).

Kim, Young Duk, et al., "Siloxane-Based Biocatalytic Films and Paints for Use as Reactive Coatings," Biotechnology and Bioengineering, Vol. 72, No. 4, pp. 475-482 (Feb. 20, 2001).

Kovacs, K., et al., "Preparation and Properties of a Novel Immobilized Cholinesterase," Journal of Applied Biochemistry 4, pp. 11-18 (1982).

Kramer, D.N., et al., "Colorimetric Determination of Acetylcholinesterase Activity," Analytical Chemistry, Vol. 30, No. 2, pp. 251-254 (Feb. 1958).

Kröger, N., et al., "Polycationic Peptides from Diatom Biosilica That Direct Silica Nanosphere Formation," Science, Vol. 286, pp. 1129-1132 (Nov. 5, 1999).

Kröger, N., et al., "Self-Assembly of Highly Phosphorylated Silaffins and Their Function in Biosilica Morphogenesis," Science, Vol. 298, pp. 584-586 (Oct. 18, 2002).

Lei, C., et al., "Entrapping Enzyme in a Functionalized Nanoporous Support," J. Am. Chem. Soc. 124, pp. 11242-11243 (2002).

Naik, R.R., et al., "Controlled Formation of Biosilica Structures *in Vitro*," The Royal Society of Chemistry/Chem. Commun., pp. 238-239 (2003).

Naik, R.R., et al., "Silica-Precipitating Peptides Isolated from a Combinatorial Phage Display Peptide Library," J. Nanosci. Nanotech., Vol. 2, No. 1, pp. 95-100 (2002).

Novick, S.J., et al., "Protein-Containing Hydrophobic Coatings and Films," Biomaterials 23, pp. 441-448 (2002).

Shtelzer, S., et al., "Properties of Trypsin and of Acid Phosphatase Immobilized in Sol-Gel Glass Matrices," Biotechnology and Applied Biochemistry 15, pp. 227-235 (1992).

Applicants offer to supply any explanation or discussion of the documents that the Examiner feels is necessary or desirable and which is requested.

**Attorney Docket No.: 3148-6231.1US**

This Information Disclosure Statement is filed within three (3) months of the filing date of the above-identified application, and no certification pursuant to 37 C.F.R. § 1.97(c) or a fee pursuant to 37 C.F.R. § 1.17(p) is required.

Respectfully submitted,

A handwritten signature in black ink that reads "Katherine A. Hamer". The signature is written in a cursive style with a large, stylized 'K' and 'H'.

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Date: March 18, 2004  
KAH/ps:ljb

Enclosures: Form PTO-1449  
Cited Documents

Document in ProLaw

Form PTO-1449  <b>INFORMATION DISCLOSURE CITATION IN AN APPLICATION</b>  <i>(Use several sheets if necessary)</i>			Docket Number (Optional) <b>3148-6231.1US</b>		Application Number <b>Not Yet Assigned</b>		
			Applicant <b>Naik et al.</b>				
			Filing Date <b>3/18/04</b>		Group Art Unit <b>Unknown</b>		
<b>U.S. PATENT DOCUMENTS</b>							
EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE	
	3,821,083	06/28/1974	Van Leemputten et al.				
	5,874,109	02/23/1999	Ducheyne et al.				
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	WO 00/35993 A1	06/22/2000	Morse et al.				
	WO 01/62906 A2	08/30/2001	Basheer				
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	EP 1 252 184 A1	10/23/2002	Kajino et al.				
	WO 03/066209 A1	08/14/2003	Marteaux et al.				
<b>OTHER DOCUMENTS</b> <span style="float: right; font-size: small;">(Including Author, Title, Date, Pertinent Pages, Etc.)</span>							
		Akbarian, F., et al., "Spectroscopic Determination of Cholinesterase Activity and Inhibition in Sol-Gel Media," Journal of Sol-Gel Science and Technology 8, pp. 1067-1070 (1997).					
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